REMARKS

Reconsideration of the above-identified application in view of the preceding amendments and the following remarks is respectfully requested.

Claims 1-31 (original) and Claims 34-46 (new) are pending in this application. Claims 32 and 33 have been withdrawn from consideration as being directed to non-elected subject matter. Claims 1, 10, 15 and 24 have been amended to more particularly point out and define the subject matter regarded as inventive. New Claims 34-46 have been added. In addition, the specification has been amended to correct certain typographical errors. No new matter has been added to the subject application by these amendments, nor have any new issues been raised. Support for the amendments is found throughout the written specification and accompanying figures, which include photomicrographs and images of the claimed invention.

AFFIRMATION OF ELECTION/RESTRICTION

The invention was subject to a restriction requirement. In particular, restriction was required with respect to Claims 1-31 drawn to a method, and Claims 32-33 drawn to a product. On October 4, 2004, applicant's representative provisionally elected, with traverse, the invention defined by Claims 1-31, for prosecution. Applicant hereby affirms the election of Claims 1-31, and reserves the right to prosecute Claims 32-33 in a copending application.

PRIOR ART REJECTIONS

Claim Rejections – 35 U.S.C. §102

Claims 1-2, 3-5 and 9 were rejected under 35 U.S.C. §102(b) over U.S. Patent No. 5,743,013 to Taylor et al.

Taylor et al. disclose a method of coating the tips of turbine blades with a zirconium-based oxide, for example, by using "shielded plasma spray techniques or HVOF techniques." (Col. 5, lns. 45-46). Taylor et al. also disclose roughening the blade tips prior to coating by high pressure pure waterjet. (See col. 4, lns 6-8). Taylor et al. recognize that a "high pressure water jet will erode a metallic surface, producing a new surface that is ideally suited for subsequent coating, because it is roughened on a very fine scale and is totally free of surface contamination, such as abrasive grit inclusions from normal surface roughening procedures like grit blasting." (Col. 4, lns. 7-14). Taylor et al. also recognize that "[t]he water jet pressure and the nozzle traverse rate must be carefully controlled to avoid too deep erosion." (Col. 4, lns. 14-17). However, Taylor et al. fail to disclose or suggest the specific water jet pressure and traverse rate used to roughen a blade tip on a very fine scale prior to coating. The ordinarily skilled artisan is therefore without guidance to achieve the results disclosed by Taylor et al.

Furthermore, Taylor et al. do not disclose or suggest that a high pressure water jet applied at a sufficient pressure and effective sweep rate can be used to remove the cold worked surface layer of a superalloy substrate to reveal the underlying grain structure of the superalloy. They simply teach the use of a high pressure waterjet to produce a surface that is "roughened on a very fine scale." There is no recognition or appreciation in Taylor et al. of the benefits achieved by exposing the grain structure of a superalloy substrate prior to applying a coating thereto by HVOF.

In contrast to Taylor et al., Claim 1, as amended, defines a method for applying a metallurgical coating to a superalloy substrate having a cold worked surface and an underlying grain structure, which includes the step of directing a water jet having a sufficient pressure

against the surface of the superalloy substrate while traversing the surface at an effective sweep rate, to modify the surface morphology of the substrate in such a manner so as to remove the cold worked surface of the substrate and expose the underlying grain structure of the superalloy. Taylor et al. do not disclose or suggest a coating method that includes this step. Accordingly, Claim 1, and each of the claims depending therefore, including rejected Claims 2, 3-5 and 9, are not anticipated by Taylor et al., and withdrawal of the rejection under 35 U.S.C. §102(b) is respectfully requested.

Claims 1-2 and 4-5 were rejected under 35 U.S.C. §102(b) over U.S. Patent No. 6,571,472 to Berry et al.

Berry et al. disclose a method for repairing a high-load bearing gas turbine engine component comprising a honeycomb structure on a backing substrate. The method includes the steps of removing the honeycomb structure from the backing substrate and depositing a build-up of material onto the backing substrate by HVOF deposition. In particular, Berry et al. disclose removal of the honeycomb structure by conventional mechanical turning operations. The remaining seal backing is then grit blasted and "[t]he backing is cleaned by high pressure water jet" using 30-50 KSI water pressure, at 100-400 inches per minute surface velocity, 0.01 to 0.5 inch feed rate, and .025 to 2.5 inch standoff distance. (See col. 4, ln. 64 – col. 5, ln. 8).

Berry et al. do not disclose or even suggest the use of a high pressure water jet to modify the surface morphology of the engine component before a restorative coating is applied thereto. Rather, in Berry et al. a high pressure water jet is simply used to clean the surface of the engine component.

In contrast to Berry et al., Claim 1, as amended, defines a method for applying a metallurgical coating to a superalloy substrate having a cold worked surface and an underlying grain structure, which includes the step of directing a water jet having a sufficient pressure against the surface of the superalloy substrate while traversing the surface at an effective sweep rate, to modify the surface morphology of the substrate in such a manner so as to remove the cold worked surface of the substrate and expose the underlying grain structure of the superalloy. Berry et al. do not disclose or suggest a coating method that includes this step. Accordingly, Claim 1, and each of the claims depending therefrom, including rejected Claims 2 and 4-5, are not anticipated by Berry et al., and withdrawal of the rejection under 35 U.S.C. §102(b) is respectfully requested.

Claim Rejections – 35 U.S.C. §103

Claim 7 was rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,743,013 to Taylor et al.

Claim 7 depends from amended Claim 1 and thus includes all of the recitations set forth therein. As noted above, Taylor et al. fail to disclose or suggest the recitations of amended Claim 1, particularly the step of directing a water jet having a sufficient pressure against the surface of a superalloy substrate while traversing the surface of the substrate at an effective sweep rate, to modify the surface morphology of the substrate in such a manner so as to remove the cold worked surface of the substrate and expose the underlying grain structure of the superalloy.

Although, as the Examiner points out, Taylor et al. recognize that "[t]he water jet pressure and the nozzle traverse rate must be carefully controlled to avoid too deep erosion,"

they fail to disclose or suggest the operating parameters needed to achieve the resulting surface morphology defined by Claim 1. Moreover, it is respectfully submitted that routine experimentation by one of ordinary skill in the art, based upon the teachings of Taylor et al., would not have resulted in the claimed modification to the surface morphology of the superalloy substrate. This is because Taylor et al. simply did not appreciate the desirability of exposing the grain structure of the superalloy substrate using a high pressure water jet, as evidenced by their stated desire to simply roughen the surface to improve bond strength (see col. 3, lns. 64-66) and to control the water jet parameters to "avoid too deep erosion."

In contrast, applicant recognized that a grain etched surface prepared by high pressure water jet treatment at a sufficient pressure and an effective sweep rate provides "super micro-roughness," as revealed under a scanning electron microscope at 5000X magnification (see Fig. 11), yielding a vastly increased amount of surface area for bonding with the HVOF coating. (see Page 12, lns. 8-13). The grain etched surface that results from the claimed waterjet treatment is what enables deposition of a metallurgical coating layer having a thickness ranging to and in excess of .500 inches, as specified in Claim 7.

Accordingly, Claim 7 is not rendered obvious by Taylor et al. at least for the reasons set forth above with respect to Claim 1. Withdrawal of the rejection under 35 U.S.C. §103(a) is therefore respectfully requested.

Claims 3, 10, 11 and 14 were rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,743,013 to Taylor et al. as applied to Claims 1-2, 4-5 and 9, above, and further in view of U.S. Patent No. 5,672,394 to Hardee et al.

As noted above, Taylor et al. fail to disclose or suggest, the recitations of amended Claims 1 and 10, particularly the step of directing a water jet having a sufficient pressure against the surface of a superalloy substrate while traversing the surface of the substrate at an effective sweep rate, to modify the surface morphology of the substrate in such a manner so as to remove the cold worked surface layer of the substrate and expose the underlying grain structure of the superalloy.

Hardee et al. disclose a method of preparing or cleaning the surface of an electrode for coating by etching using an acid etching solution such as hydrochloric, sulfuric, perchloric, nitric, oxalic, tartaric, and phosphoric acids. (See, col. 4, ln. 66 – col. 5, ln. 7). Hardee et al. also teach that "[e]tching, or other treatment such as water blasting, following grit blasting can remove embedded grit and provide the desirably roughened surface." (Col. 6, lns. 58-61). Hardee et al. do not teach or suggest that high pressure water jet can be employed to remove a cold worked surface layer of the electrode and expose the underlying grain structure of the material from which it is formed, prior to coating the electrode. Hardee et al. simply teach the use of water blasting to clean grit from a surface after it has been mechanically roughened.

Neither Taylor et al. nor Hardee et al., disclose or suggest, either alone or in combination, in whole or in part, the invention defined by Claim 3, 10, 11 and 14. More particularly, neither reference discloses or suggests directing a high pressure water jet against the surface of a superalloy substrate roughened by grit blasting so as to remove the cold worked surface layer of the substrate and expose the underlying grain structure of the superalloy. Accordingly, Claims 3, 10, 11 and 14 are not rendered obvious by the combination of references

cited by the Examiner, and withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully requested.

Claim 6 was rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,743,013 to Taylor et al. as applied to Claims 1-2, 4-5 and 9, above, and further in view of U.S. Patent No. 5,956,845 to Arnold et al.

As noted above, Taylor et al. fail to disclose or suggest a method that includes the step of directing a water jet having a sufficient pressure against the surface of a superalloy substrate while traversing the surface of the substrate at an effective sweep rate, to modify the surface morphology of the substrate in such a manner so as to remove the cold worked surface layer of the substrate and expose the underlying grain structure of the superalloy, as recited in Claim 1, from which Claim 6 depends.

Arnold et al. teach preparing a workpiece before a high density coating process by "cleaning, blasting, machining, masking or other like operations." (Col. 4, lns. 41-43). Arnold et al. fail to disclose or suggest the use of a high pressure water jet to modify the surface of a substrate by removing the cold worked surface layer of the substrate and exposing the underlying grain structure of the superalloy. Thus, Arnold et al. do not overcome the deficiencies of Taylor et al. which were noted above with respect to Claim 1. Moreover, neither reference discloses or suggests, either alone or in combination, the invention defined by Claim 6. Accordingly, Claim 6 is not rendered obvious by the combination of Taylor et al. and Arnold et al., at least for the reasons set forth above with respect Claim 1. Withdrawal of the rejection under 35 U.S.C. §103(a) is therefore respectfully requested.

Claim 12 was rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,743,013 to Taylor et al. in view of U.S. Patent No. 5,672,394 to Hardee et al. as applied to Claim 3, 10, 11 and 14 above, and further in view of U.S. Patent No. 5,956,845 to Arnold et al.

Taylor et al. do not disclose or suggest the use of a high pressure water jet to modify the surface morphology of a superalloy substrate in such a manner so as to remove the cold worked surface layer of the substrate and expose the underlying grain structure of the superalloy. Taylor et al. simply disclose roughening a surface on a very fine scale using a high pressure water jet. At best, Hardee et al. teach the use of water blasting to clean grit from a surface after it has been roughened. Arnold et al. merely teach preparing a workpiece by cleaning, blasting, machining, masking or other like operations, prior to coating.

In sum, neither Taylor et al., Hardee et al. nor Arnold et al, disclose or suggest, either alone or in combination, in whole or in part, a method as defined by Claim 12 which includes, among others, the steps roughening the surface of a superalloy substrate through grit blasting, directing a water jet having a sufficient pressure against the roughened surface while traversing the surface at an effective sweep rate to remove the cold worked surface layer of the substrate and expose the underlying grain structure of the superalloy, depositing a metallurgical coating on the modified surface of the substrate by HVOF and subjecting the coated substrate to hot isostatic pressing. Accordingly, Claim 12 is not rendered obvious by the combination of references cited by the Examiner, and withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully requested.

Claim 8 was rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,743,013 to Taylor et al. as applied to Claims 1-2, 4-5 and 9, above, and further in view of WO 02/40745.

Taylor et al. teach the use of a high pressure water jet to roughen a substrate on a very fine scale before applying a coating, but they fail to disclose or suggest the use of a high pressure water jet to remove the cold worked surface layer of a superalloy substrate and expose the underlying grain structure of the superalloy as recited in amended Claim 1, from which Claim 8 depends.

As for WO 02/40745, the English language abstract provided by the Examiner states, in its entirety, "[t]he invention relates to a material, in particular for a thermal insulation layer, with increased thermal stability, a low heat conductivity and a large thermal coefficient of expansion. According to the invention, said material comprises lanthanides, in particular the elements La, Ce, Nd, Yb, Lu, Er or Tm, which preferably occur as a mixture in a Perovskite structure. Said thermal insulation layer is particularly suitable for replacing thermal insulation layers comprising yttrium stabilized zirconium oxides (YSZ) as the thermal stability thereof is given as well over 1200 C." Thus, to the extent that the English language portion of WO 02/40745 is cited, it fails to overcome the primary deficiency of Tayor et al., in that it does not teach removal of a cold worked surface layer to expose underlying grain structure by high pressure water jet. Accordingly, Claim 8 is not rendered obvious by the combination of Taylor et al. and WO 02/40745, at least for the reasons set forth above with respect Claim 1. Withdrawal of the rejection under 35 U.S.C. §103(a) is therefore respectfully requested.

Claim 13 was rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,743,013 to Taylor et al. in view of U.S. Patent No. 5,672,394 to Hardee et al. as applied to Claims 3, 10, 11 and 14, above, and further in view of WO 02/40745.

Taylor et al. do not disclose or suggest the use of a high pressure water jet to modify the surface morphology of a superalloy substrate in such a manner so as to remove the cold worked surface layer of the substrate and expose the underlying grain structure of the superalloy. Taylor et al. merely disclose roughening a surface on a very fine scale using a high pressure water jet. Hardee et al. teach the use of water blasting to clean grit from a surface after it has been roughened. The English language portion of WO 02/40745 does not make any mention whatsoever of high pressure water jet treatment.

In sum, neither Taylor et al, Hardee et al. nor WO 02/40745, disclose or suggest, either alone or in combination, in whole or in part, a method as defined by Claim 13 which includes, among others, the steps of roughening the surface of a superalloy substrate through grit blasting, directing a water jet having a sufficient pressure against the roughened surface while traversing the surface at an effective sweep rate to remove the cold worked surface layer of the substrate and expose the underlying grain structure of the superalloy, and depositing a platinum aluminide metallurgical coating. Accordingly, Claim 13 is not rendered obvious by the combination of references cited by the Examiner, and withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully requested.

Claims 15, 18-19 and 21 were rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,743,013 to Taylor et al. as applied to Claims 1-2, 4-5 and 9, above, and further in view of U.S. Patent No. 6,607,611 to Darolia.

Taylor et al. teach the use of a high pressure water jet to roughen a substrate on a very fine scale before coating, but they fail do not disclose or suggest the use of a high pressure water jet to remove the cold worked surface layer of a substrate and expose underlying grain structure

prior to depositing a coating layer, as recited in amended Claim 15. Taylor et al. also fail to disclose the step of roughening the surface of the coating layer prior to applying a second coating, as recited in amended Claim 15.

Dariola teaches applying a bond coat layer to a superalloy substrate and then applying a ceramic layer over the bond coat layer. Dariola also teaches roughening the bond coat layer "by grit blasting" to better adhere with the ceramic layer. (Col. 6, lns. 10-20). Dariola does not disclose or suggest the use of high pressure water jet to roughen the second layer, and moreover, there is no suggestion within Dariola that high pressure water jet can be used to remove a cold worked surface layer of the substrate and expose the underlying grain structure of the superalloy prior to applying the bond coat.

In sum, neither Taylor et al. nor Dariola, disclose or suggest, either alone or in combination, in whole or in part, the invention defined by amended Claim 15. Accordingly, Claim 15 and Claims 18-19 and 21 which depend therefrom are not rendered obvious by the combination of references cited by the Examiner, and withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully requested.

Claim 16 was rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,743,013 to Taylor et al. in view of U.S. Patent No. 6,607,611 to Darolia as applied to Claim 15, 18, 19 and 21 above, and further in view of U.S. Patent No. 5,672,394 to Hardee et al.

Taylor et al. do not disclose or suggest the use of a high pressure water jet to modify the surface morphology of a superalloy substrate in such a manner so as to remove the cold worked surface layer of the substrate and expose the underlying grain structure of the superalloy. Taylor et al. merely disclose roughening a surface on a very fine scale using a high pressure water jet.

At best, Hardee et al. teach the use of water blasting to clean grit from a surface after it has been roughened. Dariola teaches roughening a bond coat layer by grit blasting to better adhere with the ceramic layer.

In sum, neither Taylor et al, Dariola nor Hardee et al., disclose or suggest, either alone or in combination, in whole or in part, a method as defined by Claim 16 which includes, among others, the steps roughening the surface of a superalloy substrate through grit blasting, directing a water jet having a sufficient pressure against the roughened surface while traversing the surface at an effective sweep rate to remove the cold worked surface layer of the substrate and expose the underlying grain structure of the superalloy, depositing a first metallurgical coating layer onto the surface of the substrate by HVOF spray, directing a water jet having a sufficient pressure against the surface of the first metallurgical coating layer for a sufficient time period to modify the surface morphology of the first metallic coating layer, and then depositing a second coating layer onto the modified surface of the first metallurgical coating layer. Accordingly, Claim 16 is not rendered obvious by the combination of references cited by the Examiner, and withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully requested.

Claim 20 was rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,743,013 to Taylor et al. in view of U.S. Patent No. 6,607,611 to Darolia as applied to Claim 15, 18, 19 and 21 above, and further in view of WO 02/40745.

Taylor et al. do not disclose or suggest the use of a high pressure water jet to modify the surface morphology of a superalloy substrate by removing the cold worked surface layer of the substrate and exposing the underlying grain structure of the superalloy. Taylor et al. merely disclose roughening the surface of a blade tip on a very fine scale using a high pressure water jet.

Dariola teaches roughening a first bond coat layer by grit blasting to better adhere with a second ceramic layer. The English language portion of WO 02/40745 does not make any mention whatsoever of treating a surface with a high pressure water jet.

In sum, neither Taylor et al, Dariola, nor WO 02/40745, disclose or suggest, either alone or in combination, in whole or in part, a method as defined by Claim 20 which includes, among others, the steps of directing a water jet having a sufficient pressure against the roughened surface of a superalloy substrate while traversing the substrate at an effective sweep rate to remove the cold worked surface layer of the substrate and expose the underlying grain structure of the superalloy, depositing a first metallurgical coating layer onto the surface of the substrate by HVOF spray, directing a water jet having a sufficient pressure against the surface of the first metallurgical coating layer for a sufficient time period to modify the surface morphology of the first metallic coating layer, and then depositing a second coating layer onto the modified surface of the first metallurgical coating layer, wherein the deposition of at least one of the first and second metallurgical coating layers includes the step of depositing a platinum aluminide metallurgical coating. Accordingly, Claim 20 is not rendered obvious by the combination of references cited by the Examiner, and withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully requested.

Claims 17, 22-24, 26-27 and 29-31 were rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,743,013 to Taylor in view of U.S. Patent No. 6,607,611 to Darolia as applied to Claim 15, 18, 19 and 21 above, and further in view of U.S. Patent No. 5,956,845 to Arnold et al.

Taylor et al. do not disclose or suggest the use of a high pressure water jet to modify the surface morphology of a superalloy substrate by removing the cold worked surface layer of the

substrate and exposing the underlying grain structure of the superalloy. Taylor et al. merely disclose roughening a surface on a very fine scale using a high pressure water jet. Dariola teaches roughening a first bond coat layer by grit blasting to better adhere with a second ceramic layer. Arnold et al. merely teach preparing a workpiece by cleaning, blasting, machining, masking or other like operations, prior to coating.

With respect to Claims 17, 22 and 23, it is submitted that neither of the references cited by the Examiner, disclose or suggest, either alone or in combination, in whole or in part, a method which includes, among others, the steps of directing a water jet having a sufficient pressure against the roughened surface of a superalloy substrate while traversing the substrate at an effective sweep rate to remove the cold worked surface layer of the substrate and expose the underlying grain structure of the superalloy, depositing a first metallurgical coating layer onto the surface of the substrate by HVOF spray, directing a water jet having a sufficient pressure against the surface of the first metallurgical coating layer for a sufficient time period to modify the surface morphology of the first metallic coating layer, and then depositing a second coating layer onto the modified surface of the first metallurgical coating layer, wherein the deposition of at least one of the first and second metallurgical coating layers includes the step of depositing a platinum aluminide metallurgical coating.

With respect to Claims 24, 26-27 and 29-31, it is submitted that neither of the references cited by the Examiner, disclose or suggest, either alone or in combination, in whole or in part, a method which includes, among others, the steps of directing a water jet having a sufficient pressure against the surface of a superalloy substrate while traversing the substrate at an effective sweep rate to remove the cold worked surface layer of the substrate and expose the underlying

grain structure of the superalloy, depositing a first metallurgical coating layer onto the surface of the substrate by HVOF, directing a water jet having a sufficient pressure against the surface of the first metallurgical coating layer for a sufficient time period to modify the surface morphology of the first metallic coating layer, depositing a second coating layer onto the modified surface of the first metallurgical coating layer by HVOF, directing a water jet having a sufficient pressure against the surface of the second metallurgical coating layer for a sufficient time period to modify the surface morphology of the second metallic coating layer, and depositing a third coating layer onto the modified surface of the second coating layer.

In sum, Claims 17, 22-24, 26-27 and 29-31 are not rendered obvious by the combination of references cited by the Examiner, and withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully requested.

Claim 25 was rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,743,013 to Taylor et al. in view of U.S. Patent No. 6,607,611 to Darolia and U.S. Patent No. 5,956,845 to Arnold et al. as applied to Claims 17, 22-24, 26-27 and 29-31 above, and further in view of U.S. Patent No. 5,672,394 to Hardee et al.

Taylor et al. disclose roughening a surface on a very fine scale using a high pressure water jet. Taylor et al. do not disclose or suggest the use of a high pressure water jet to modify the surface morphology of a superalloy substrate by removing the cold worked surface layer of the substrate and exposing the underlying grain structure of the superalloy. Dariola teaches roughening a first bond coat layer by grit blasting to better adhere with a second ceramic layer. Arnold et al. merely teach preparing a workpiece by cleaning, blasting, machining, masking or

other like operations, prior to coating. Hardee et al. simply teach the use of water blasting to clean grit from a surface after it has been roughened.

It is submitted that neither of the references cited by the Examiner, disclose or suggest, either alone or in combination, in whole or in part, a method which includes, among others, the steps of directing a water jet having a sufficient pressure against surface of a superalloy substrate previously roughened by grit blasting while traversing the substrate at an effective sweep rate to remove the cold worked surface layer of the substrate and expose the underlying grain structure of the superalloy, depositing a first metallurgical coating layer onto the surface of the substrate by HVOF, directing a water jet having a sufficient pressure against the surface of the first metallurgical coating layer for a sufficient time period to modify the surface morphology of the first metallic coating layer, depositing a second coating layer onto the modified surface of the first metallurgical coating layer by HVOF, directing a water jet having a sufficient pressure against the surface of the second metallurgical coating layer for a sufficient time period to modify the surface morphology of the second metallic coating layer, and depositing a third coating layer onto the modified surface of the second coating layer. Accordingly, Claim 25 is not rendered obvious by the combination of references cited by the Examiner, and withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully requested.

Claim 28 was rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,743,013 to Taylor et al. in view of U.S. Patent No. 6,607,611 to Darolia and U.S. Patent No. 5,956,845 to Arnold et al. as applied to Claims 17, 22-24, 26-27 and 29-31 above, and further in view of WO 02/40745.

Taylor et al. merely disclose the use of a high pressure water jet to roughen a surface on a very fine scale. Taylor et al. do not disclose or suggest the use of a high pressure water jet to

modify the surface morphology of a superalloy substrate by removing the cold worked surface layer of the substrate and exposing the underlying grain structure of the superalloy. Dariola teaches roughening a first bond coat layer by grit blasting to better adhere with a second ceramic layer. Arnold et al. merely teach preparing a workpiece by cleaning, blasting, machining, masking or other like operations, prior to coating. The English language portion of WO 02/40745 does not mention high pressure water jet treatment.

Neither of the references cited by the Examiner, disclose or suggest, either alone or in combination, in whole or in part, a method which includes, among others, the steps of directing a water jet having a sufficient pressure against the surface of a superalloy substrate while traversing the substrate at an effective sweep rate to remove the cold worked surface layer of the substrate and expose the underlying grain structure of the superalloy, depositing a first metallurgical coating layer onto the surface of the substrate by HVOF, directing a water jet having a sufficient pressure against the surface of the first metallurgical coating layer for a sufficient time period to modify the surface morphology of the first metallic coating layer, depositing a second coating layer onto the modified surface of the first metallurgical coating layer by HVOF, directing a water jet having a sufficient pressure against the surface of the second metallurgical coating layer for a sufficient time period to modify the surface morphology of the second metallic coating layer, and depositing a third coating layer onto the modified surface of the second coating layer, wherein the deposition of at least one of the first and second metallurgical coating layers includes the step of depositing a platinum aluminide coating, as recited in Claim 28. Accordingly, Claim 28 is not rendered obvious by the combination of

references cited by the Examiner, and withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully requested.

NEWLY PRESENTED CLAIMS

New Independent Claims 34 and 46 are presented herein for examination. It is respectfully submitted that Claim 34 is patentable over the art of record. More particularly, none of the prior art references of record, disclose or suggest, either alone or in combination, in whole or in part, a method for applying a metallurgical coating to a superalloy substrate having a cold worked surface and an underlying grain structure which comprises, among others, the step of traversing the surface of the substrate with a water jet having a pressure of about between 45,000 to 65,000 psi at a sweep rate of about between 25 to 100 inches per minute so as to remove the cold worked surface of the substrate and expose the underlying grain structure of the superalloy.

It is further submitted that new Claim 46 is patentable over the art of record. More particularly, none of the prior art references of record, disclose or suggests, either alone or in combination, in whole or in part, a method for applying a metallurgical coating to a superalloy substrate having a cold worked surface layer and an underlying grain structure which comprises, among others, the steps of removing the cold worked surface layer of the substrate to expose the underlying grain structure of the superalloy by high pressure water jet treatment, and depositing a metallurgical coating on the water jet treated surface of the substrate by high velocity oxygen fuel spray.

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

A Supplemental Information Disclosure Statement is being submitted concurrently herewith, which includes a European Search Report dated December 17, 2004 issued in a European Patent Application, which corresponds to the subject application. It is respectfully submitted that the claims of the subject application are patentable over the references cited in the European Search Report, either alone or in combination with one another, or any of the other references of record in this application.

CONCLUSION

It is respectfully submitted that each of the claims now pending in this application, namely Claims 1-31 and 34-46, are directed to patentable subject matter, and allowance thereof is earnestly solicited.

Respectfully submitted,

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